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Nanostructure Boride Materials Manufacturing

for manufacture of high heat ceramics and energy efficient windows

Summary

- Dr. Graeve's technology details the manufacture of lanthanum hexaboride (LaB₆) and similar hexaboride powders. These finely dispersed hexaboride particles prove superior for use in manufacturing since they are highly unagglomerated. The manufacturing technology for hexaborides in this patent application are less expensive than other manufacturing methods and has many potential market applications including high temperature ceramics and energy efficient windows. The fine dispersion of this material in ceramics will help avoid the incidence of cracking and the spread of cracks in high heat applications such as turbine engines. Windows can be made to be much more energy efficient. LaB₆ blocks infrared light through windows, keeping homes warmer in winter and cooler in summer while not affecting visible light. Applications also include solar voltaic cells.

Advantages

- UNR's lanthanum hexaboride (LaB₆) nanoparticle manufacturing uses less expensive starting materials resulting in lower cost to the end product. Current LaB₆ products on the market, including lanthanum nanocrystalline, have physical limitations leading to a reduced quality, including the potential to become highly agglomerated.
- The oxidation resistance has been shown to be greatly enhanced by the addition of lanthanum hexaboride in ultra-high temperature ceramics. The use of other hexaborides for enhancing oxidation resistance can result in ceramic composites that can function at higher temperatures. This is of benefit in the aerospace industry, which is continuously striving to use higher-temperature ceramics in engine components.

Intellectual Property

Combustion Synthesis Method and Boron-Containing Materials Produced Therefrom
Technology Transfer ID #: UNR08-018

Patent Pending

Dr. Olivia Graeve